

radial origin for the flexor sublimis, and of a specialized flexor pollicis longus; but the presence of a third thumb-extensor and the limitation of the extensor minimi digiti to the fifth finger are tendencies towards the anthropoid disposition of parts. The small and variable psoas parvus, the absent pyramidalis, are interesting in consideration of the variability of these parts in man. 5. In the lower limb the most decidedly pithecoïd features are the small size of the gluteus maximus and its elongated insertion, the position of the semimembranosus, the absence of a tibial head of the solæus and of the peronæus tertius, and the doubling of the tibialis anticus.

#### XLV.—Contributions to the Crag-Fauna. Part II.\*

By ALFRED BELL.

CLOSE research in some new sections and excavations that have been made in the Suffolk-Crag district during the past autumn and winter has produced some very interesting results. Upwards of fifty species of shells (some being undescribed) new to our English Crag, and more than thirty species of others which occur at different horizons to those known previously, have amply rewarded the efforts of my brothers and self, the Red-Crag Polyzoa being also increased from fifteen to thirty species.

Species marked thus \* signify the new additions; the others are simply new to the horizon to which they are referred.

C. C., R. C., Norw. C., and Chil. ser. are used as contractions for the Coralline, Red, and Norwich Crag, and the Chillesford series.

#### MAMMALIA.

\**Balæna emarginata*, Ow. The only previously recorded cetotolite from the C. C. (now in the Museum of Practical Geology) was obtained by Col. Alexander, many years since, and is of another species, probably *B. gibbosa*, Ow. C. C. Orford. Second examples of *Castor veterior*, Lamk. (an incisor), and *Ziphius mediolineatus*, Ow., have been lately obtained by myself in the Red Crag.

#### PISCES.

No list of Crag fishes having been published (probably owing to the difficulty of identifying the fragmentary portions of the skeleton met with), I offer the following short one,

\* For Part I. see Ann. & Mag. Nat. Hist. Sept. 1870.

based upon the teeth and otolites, the latter determined by Mr. Higgins.

*Anarrhichas lupus*, L. R. C. Waldringfield.

*Carcharodon megalodon*, Agas. R. C. Waldringfield.

*Merlangus pollachius*, Flem. C. C. (common).

— *virens*, L. C. C. (very rare).

— *vulgaris*, L. C. C. (very rare).

*Morrhua eglefinus*, L. C. C. (very rare).

— *lusca*, L. C. C. (common).

— *minuta*, L. C. C. (very rare).

— *vulgaris*, Cuv. C. C. (common). R. C. Shottisham (very rare).

*Platax Woodwardi*, Ag. R. & Norw. C.

*Raia antiqua*, Ag. R. & Norw. C.

—, sp. R. C. Walton-Naze and Butley.

Sharks' teeth (of several genera, *Otodus*, *Lamna*, *Oxyrhina*, &c.) are very abundant in the lower division of the Red Crag, but are scarce in the Coralline Crag, and are generally considered to be derived from the abrasion of older deposits, chiefly London Clay. I venture to put in a word in favour of *Carcharodon megalodon*, Ag., being a native of the Red-Crag sea. Its distribution in Miocene times being world-wide, the British-Museum collection containing examples from Malta, Bordeaux, Maryland, Aspinwall (Panama), and New Zealand, it is likely to have lived on for some little time after the Miocene epoch had passed away.

The only sharks' teeth that I have seen in the Coralline Crag are a species of *Lamna* (1 sp.) and one of *Oxyrhina* (3 sp.), closely resembling *O. xiphodon*, Ag., a fossil of the French and Belgian Miocenes. I have no doubt of the *Oxyrhina* being an inhabitant of the Coralline-Crag sea. A few vertebræ resembling the figures given by Agassiz of *Platax Woodwardi* also occur.

#### CRUSTACEA.

*Atecyclus heterodon*, Leach. C. C.

*Cancer pagurus*, L. C. & R. C.

*Carcinas mænas*, L. C. C.

*Ebalia Bryerii*, Leach. C. C.

\* *Gonoplax angulata*, Leach. C. C.

*Pagurus Bernhardus*, L. C. C.

*Portunus puber*, L. C. C.

(This list includes two or three that I have extracted from Prof. Morris's catalogue.)

## ECHINODERMATA.

- Echinus sphaera*?, Müll. (plates only). C. C. Sutton. I have little doubt of the identity of the fossil and recent forms, the only difference being in the size of the tubercles.  
*Echinus Woodwardii*, Desor. R. C. Walton-Naze.  
*Echinocyamus pusillus*, Müll. Chil. ser. Aldeby.  
*Spatangus regina*, Gray. R. C. Sutton.  
*Temnechinus excavatus*, S. Wood. R. C. Waldringfield and Foxhall.

## ANNELIDA.

- Serpula triquetra*, Lam. C. C. Sutton.  
 — *vermicularis* (rough var.). C. C. Sutton. R. C. Walton-Naze.  
 — —, Ellis (smooth var.). Chil. ser. Sudbourn.  
 \**Sabellaria conchilega*?, Pallas. R. C. Shottisham Creek.  
 \**Spirorbis nautiloides*, Lam. C. C. Sutton.  
*Ditrupa gadus*, Mont. C. & R. C.

## MOLLUSCA.

(Freshwater.)

- Corbicula fluminalis*, Müll. R. C. Waldringfield.  
*Paludina parilis*, S. W. R. C. Waldringfield. Figured by A. Künth (Zeitschr. d. deutsch. g. G. Berlin, 1865) as *P. diluviana*. Loc. Tempelhof, near Berlin.  
*Limnea palustris*, Müll. R. C. Butley.  
 — *truncatulus*, Müll. R. C. Butley.

(Marine.)

## CONCHIFERA.

- \**Pecten septemradiatus*, Müll. R. C. Foxhall.  
 \**Lima squamosa*, Lam. Encycl. Méthod. t. 206. f. 4. C. C. Gedgrave.  
 — *exilis*, Wood, = *L. inflata*, Lam.  
*Pinna rudis*, L. R. C. Walton-Naze.  
 \**Pectunculus insubricus*, Broc. Conch. foss. Subap. t. 11. f. 10. C. C. Orford, Sutton.  
 \* — *pilosus*, Born. R. C. Waldringfield.  
*Limopsis aurita*, Broc. R. C. Waldringfield.  
 — *pygmaea*, Phil. In Sept. 1870 I catalogued this species in the Ann. & Mag. Nat. Hist. from Walton-Naze. I have since seen it from Waldringfield and Felixstow.  
 \**Nucula nucleus*, var. *radiata*, Hanley. R. C. Waldringfield.  
 \**N. (Acila) Lyallii*, Baird, Proc. Zool. Soc. Feb. 1863. The only specimen I have found is, unfortunately, imperfect in the hinge; but the size, form, and peculiarity of sculpture

render the identification of the fossil with the recent shell an easy matter. *A. Lyallii* has been considered a variety of *N. Cobboldia*, altered by time, distance, and physical conditions; but, as the latter shell is a present inhabitant of the Japanese seas (*N. insignis*, Gould, *Otia Conchol.* p. 175), there are reasonable grounds for separating the two into distinct species, the more so as they differ in some important particulars from each other. I quote Dr. Baird's remarks:—

"This species differs from it (*i. e.* *N. Cobboldia*) in being less transversely ovate, in having the beaks more prominent, the posterior row in the hinge fewer in number, and in the costations being stronger in proportion to the size of the shell, and much fewer in number."

They also differ in the size of the adult shell, in sculpture, structure, and tumidity.

For the opportunity of examining the recent shells I have to thank Sir Charles Lyell and Mr. Jeffreys. The fossil *N. Lyallii* occurs at Butley, and the recent shell in 8–12 fathoms at Vancouver's Island.

\**Scacchia elliptica*, Scacchi (Philippi, *En. Moll. Sic.* t. xiv. f. 8). R. C. Butley. The *Kellia elliptica* of the Mon. Crag Moll. vol. ii. t. 12. f. 13, does not appear to me to be the same shell as Scacchi's.

*Astarte gracilis*, Wood (non Münst.). Dr. Weichmann informs me that the English and German shells are not identical. *A. Galeotti*, Nyst, corresponds to the Crag species (see Mon. Crag Moll.).

*Tapes texturata*, Lam. A double specimen, nearly perfect. R. C. Waldringfield.

*Donax politus*, Poli. N. C. Walton-Naze, Sutton.

*Glycimeris angusta*, Nyst. Norw. C. (Sir Charles Lyell's coll.).

*Pandora inaequalvis*, var. *obtusa*, Leach. C. C. Gedgrave.

#### GASTROPODA.

\**Cancellaria variegosa*, Broc. *Conch. foss.* Subap. t. 3. f. 8. C. C. Gedgrave. R. C. Waldringfield.

\*—— *Bonellii*, var. *dertonensis*, Bellardi, Mon. Canc. Piemonte, t. 3. f. 11, 12. C. C. Gedgrave.

\*—— *contorta*, Bast. (Bellardi, Mon. Canc. t. 3. f. 7, 8). C. C. Gedgrave.

\*—— (*Columbella*) *avara*, Say (Gould, *Inv. Mass.* fig. 197). R. C. Waldringfield. This species belongs to the same section (*Merica*, Ad.) of the Cancellaridæ as *C. mitraiformis*, Broc., and *C. Fischeri*, H. Ad.

—— *costellifera*, Sow. (*C. Couthouyi*, Jay, = *C. crispa*, Möll.,

= *C. buccinoides*, Couth. Bost. Journ. Nat. Hist. vol. xi. pl. 3. f. 3), differs somewhat from the typical Crag form in being shorter, broader, with the costæ more erect, closer, and less pronounced. The two forms occur in the R. C. at Waldringfield &c.

*Tritonium viridulum*, Fabr., comprises both varieties.

\* *Fusus americanus*, A. B. R. C. Waldringfield.

— *cordatus*, A. B. (Mon. Cr. Moll., *F. gracilis*, var.  $\beta$ , t. 6. f. 10 b). I have separated this variety from the typical form because the shell is covered from the apex to (nearly) the base of the canal with strong, corded, broad striæ, and is less variable in outline, is more slender, and has the canal less recurved than the ordinary form; apex blunt, but not mammillated.

— —, var. *contrarius*. R. C. Woodbridge.

\* *Trophon barvicensis*, Johnst. R. C. Walton, Shottisham Creek, &c.

*Terebra canalis*, S. Wood. To distinguish the next species from this, I subjoin a description of the shell, Mr. Wood not having given one in the Mon. Crag Mollusca:—

Shell dextral, conical, with a broad base; spire pointed, apex rather obtuse; whorls 11–13, sides nearly *flat*, the upper ones plicated; surface finely striated from apex to base; body-whorl rapidly contracting below; outer lip sharp, spreading towards the canal; canal recurved, open; pillar twisted, suture distinct. Long.  $1\frac{1}{4}$  inch.

*Columbella minor*, Philippi, differs from this shell in size only.

\* *Terebra exilis*, A. Bell, n. sp. Shell dextral, *slender*, apex obtuse or slightly mammillated; whorls 12–14, *convex*, contracting *towards* the top, suture well marked; plaits slight on upper whorls, finely striated longitudinally; columellar lip reflected; mouth small; canal recurved. Long. 1 inch.

*Nassa pygmaea*, Lam. R. C. Butley.

\* — *granifera*, Dujardin, Mém. Soc. Géol. France, vol. ii. pl. 20. f. 11, 12. C. C. Gedgrave.

\* — *Ascanias*, Brug. R. C. Waldringfield &c. The Mediterranean representative of *N. incrassata*.

\* — *pulchella*, A. Bell, n. sp. Shell ovate, turriculate; whorls 6, convex, plicated, deeply striated or grooved, groovings passing across the plaits, which are carried to the base of the shell; spire short, terminating in a point; suture deep; mouth roundly dilated below, acute above; outer lip slightly thickened (?), fluted in the interior by 11–13 narrow plaits; inner lip thickly enamelled, with a

strong ridge at the base; canal turned back. Long.  $\frac{4}{10}$  inch, lat.  $\frac{2}{10}$  inch. C. C. Gedgrave. R. C. Waldringfield.

- \**Nassa densicostata*, A. Bell, n. sp. The only specimen I have is, unfortunately, broken, wanting three or four of the upper whorls and part of the outer lip. It has some resemblance to *N. prismatica*, Broc., but is longer and slenderer. The costæ are slightly oblique, closely crowded, especially in the upper whorls. The whorls are covered with striæ, moderately elevated; pillar-lip having a fold at the base. Long. about  $\frac{3}{4}$  inch.

*Buccinopsis Dalei*, Sow., var. *sinistrorsa*. R. C., near Woodbridge.

- \**Ranella anglica*, A. Bell, n. sp. Shell small; whorls 3-4 (apex wanting), convex, with coarse elevated ridges on the bottom whorl crossing the periodic growths (which are very distinct) and, extending to the mouth, becoming very marked at the base; mouth angulated above, outer lip spreading towards the base, where it is sharply angulated by one of the ridges; pillar reflected; canal rather open; umbilical chink small. Long.  $\frac{6}{10}$  inch. R. C. Waldringfield.

*Purpura lapillus*, var. *incrassata*, S., closely resembles *P. septentrionalis*, Reeve (*Hab.* Sitka Sound, &c.), and is probably the same shell.

*Cassidaria bicatenata*, Sow. This shell is subject to considerable variation. Immature shells have the outer lip sloping inwards to the base, something like *C. tyrrhena*. I have had an uncommon variety from Sutton, in which the tubercles were almost absent, the shell narrow as compared with the usual type, the mouth long, and outer lip straighter. The Rev. Mr. Canham has a very fine example of this variety in his collection. Should it be distinct, *C.*

*Canhami* would be a good name for the shell.

- \**Columbella scripta*, L. Figured in Olivi, Zool. Adr. t. 5. f. 1, 2, as *Murex conulus*. R. C. Walton-Naze, Waldringfield, and Shottisham Creek.

— *sulcata*, Sow. The long and short varieties figured by Mr. S. Wood are so constant and easily distinguishable, even in immature specimens, that a separation into two species would not be perhaps altogether unadvisable. The short form is, as far as I have yet seen, a deep-water shell, and is confined to the Red Crag. The longer form I have seen in the Coralline. I would suggest the name *C. abbreviata* for the shorter shell.

*Defrancia histrix*, Jan. C. C. Sutton.

- \**Pleurotoma bicarinata*, Couthouy, Bost. Journ. Nat. Hist.



vol. ii. pl. 1. f. xi. The Crag form is larger than the American (type) shell, and is represented in size by Spitzbergen and Arctic specimens. I have had the pleasure of comparing the Crag shell with the recent species, through the kindness of Mr. Jeffreys. R. C. Butley.

*Pleurotoma perpulchra*, S. W. R. C. Walton-Naze.

—— *Bertrandi*, Payraudeau, Cat. des Moll. etc. Corse, t. 7. f. 12, 13. R. C. Bentley, Foxhall, &c.

\*—— *decussata*, Philippi, En. Moll. Sic. t. 26. f. 23. Philippi's figure gives the cancellations rather coarser than is shown by the Crag shells; but, as these latter vary, I do not think there can be any doubt as to the identification being correct. C. C. Gedgrave.

\*—— *harpularia*, Couthouy, Bost. Journ. N. H. vol. ii. p. 1, f. 10. R. C. Butley.

—— *tenuistriata*, A. Bell, = *Clav. lævigata*, S. Wood, non Philippi. C. C. Sutton.

—— *plicifera*, S. Wood. C. C. Sutton.

\*—— *tarentini*, Phil. En. Moll. Sic. t. 26. f. 26. C. C. Gedgrave.

—— *pannum*, Basterot (Bellardi, Mon. Pleur. Piemonte, t. 2. f. 5), = *P. semicolon*, var. (S. Wood).

—— *violacea*, Mighels. R. C. Butley.

\*—— —, var. *gigantea*, = *P. arctica*?, Adams. Out of three specimens seen by myself all are deficient in the upper whorls. Judging from size and sculpture, they are the same as Mörch's variety, but are all less ventricose than their recent analogues. R. C. Waldringfield.

\*—— *exarata*, Moll. R. C. Butley.

\*?—— *gracile*, Phil. En. Moll. Sic. t. 11. f. 23. R. C. Waldringfield.

\*?—— *pygmæum*, Phil. En. Moll. Sic. t. 26. f. 25. One specimen, in bad condition, but having the characters well marked, is all I have at present. R. C. Shottisham Creek.

\*—— *gracilior*, A. Bell, n. sp. Shell elongately fusiform, attenuated, fragile; whorls 8-9, convex; ribs oblique, 9 or 10 on the body-whorl, with spaces between each, of the same breadth as the ribs; spire pointed; suture deep; mouth long and narrow, canal straight; pillar slightly flexuous; labial notch rounded, situate between the suture and the shoulder of the whorl, the whole covered with fine striæ. Long.  $\frac{1}{10}$  inch, lat.  $\frac{1}{10}$  in. C. C. Gedgrave.

\*—— *striolata*, Scac. R. C. Shottisham Creek.

\*—— *curtistoma*, A. Bell, n. sp. Shell (adult) nassæform; whorls 9, moderately convex, ribbed from fourth top whorl

to base; ribs stout, straight, widely separated; top whorls finely cancellated; spire long and pointed; mouth occupying two-fifths or less of the length; canal very short and open; labial notch deep, not very broad, situate upon the shoulder of the whorl; columellar lip straight, slightly polished, the whole of the lower whorls covered with fine striæ, some of which are occasionally more elevated than the others. Long.  $\frac{6}{10}$  in. C. C. Gedgrave.

- \* *Pleurotoma notata*, A. Bell, n. sp. Shell fusiform; whorls 7-8, convex, ornamented with ribs (8-9 on the second whorl) set erect and widely apart, diminishing in size towards the top, body-whorl falling in rapidly towards the base, forming an open canal; mouth narrow, outer lip sharp, inner lip strongly reflected over a slightly sinuous pillar; suture deep. The whole of the shell is covered with fine spiral striæ, some of which (6-8 on the body, diminishing to 2 on the next whorl) are coarse and elevated. In one of my specimens these coarse striæ are coloured pink. Marks of growth distinct; notch moderate, situated between the suture and shoulder of body-whorl. Long.  $\frac{5}{10}$ , lat.  $\frac{3}{10}$  inch. C. C. Gedgrave.

- \*—— *volvula*, A. Bell, n. sp. Shell shuttle-shaped; whorls 6-7, flatly convex; ribs rather strong and oblique; suture channelled; spire shortly conical, apex pointed; body-whorl long; mouth narrow, canal longer than in last species; inner lip reflected over a nearly straight pillar; surface finely striated; notch as in last species. C. C. Gedgrave.

- \*—— *elegantula*, A. Bell, n. sp. Shell stoutly fusiform; whorls 7-9, convex, ornamented with close-set ribs, 10-12 on the second whorl; suture deep; mouth and canal open, pillar-lip reflected; notch sinuated rather deeply.

This species may be distinguished from *P. notata* by its stouter build and aspect, the greater number and prominence of the ribs, the spiral striæ being less pronounced; one, however, from its thickness, gives a subangulated look to the body and lower whorls, in which the ribs hardly reach the suture. Long.  $\frac{7}{10}$  inch, lat.  $\frac{2}{10}$  inch. C. C. Gedgrave.

The above three species have a general resemblance to each other; but as there are sufficient differences in them to enable a distinction to be made, I have considered them as separate species.

- \* *Conopleura crassa*, A. Bell, n. sp. Shell thick, shortly conical, smooth, polished; spire occupying about half the length of the shell, apex pointed; whorls 8-10, slightly



convex at bottom, constricted towards the top; suture slight, forming a channel on the top of the whorl; ribs stout, but hardly raised above the surface; mouth short, open, canal short and broad; pillar-lip straight, reflected, with the callus massed into a pad at the top, which forms one side of the labial notch; notch very large, broad, and deep; outer lip spreading. Long.  $\frac{7}{16}$  inch. C. C. Gedgrave.

*P. terebra*, Dujardin, has a general resemblance to the above; but the diagnosis and figure are both too short for comparison. A worn specimen obtained from the R. C. appears to belong to this species.

*Mitra ebenus*, Lam. R. C. Waldringfield.

\**Ovula adriatica*, Sow. (Mon. Crag Moll. tab. 2. f. 16, *Ovula Leathesii*, var.). A specimen in Mr. Jeffreys's collection is hardly to be distinguished from a Crag shell found by myself. It differs somewhat from the typical form in the expansion of the lower part of the lip. In all other particulars they agree. R. C. Butley.

\**Natica borealis*, Sow. (Beechey's Voyage, pl. 37. f. 2). R. C. Butley. Norw. C. Thorpe, Suffolk. *N. borealis* bears the same relation to *N. grælandica* that is assumed by *N. occlusa* towards *N. affinis*.

\*— *grælandica*, Beck. R. C. Shottisham. Norw. C. Thorpe, Suffolk.

\*— *Alderi*, E. F. R. C. Butley, Shottisham Creek, &c. *Odostomia lactea*, L. (*Chemnitzia elegantissima*, Mont.). R. C. Walton-Naze.

\*— (*Chemnitzia*) *plicatula*, Broc. Conch. foss. Subap. t. 7. f. 5. R. C. Walton-Naze, Butley.

— (*Chemn.*) *internodula*, Wood. A shortly conical variety, unnoticed by Mr. Wood, is not uncommon in both the C. & R. C.

— (*Chemn.*) *suturalis*, Phil. R. C. Waldringfield.

\*— *obliqua*, Alder. C. C. Sutton.

*Triforis perversa*, L. C. C. Sutton. *T. perversa* and *T. adversa* both occur in the C. C.

*Cerithiopsis tubercularis*, Mont. R. C. Shottisham Creek.

*Vermetus glomeratus*, Biv., = *V. intortus*, Mon. Crag Moll. t. 12. f. 8.

\*— *triqueter*, Biv. (Phil. En. Moll. Sic. t. 9. f. 21). R. C. Waldringfield.

— *arenarius*, L. C. C. Orford.

*Turritella planispira*, S. Wood. R. C. Shottisham Creek.

\*— *subangulata*, Broc. Conch. foss. Subap. t. 6. f. 16. R. C. Waldringfield.

*Cecum mammillatum*, S. Wood. R. C. Walton-Naze.

\* *Scalaria communis*?, Lam. R. C. Waldringfield.

\* *Menestho britannica*, A. Bell, n. sp. Shell slender, graceful, elongated; apex styliform and turned towards one side; whorls 8-9, slightly channelled at the top, and flatly convex, the last four diminishing rapidly; mouth entire, angulated above, broad below; pillar curved, suture deep; sculpture finely striated (under a lens) longitudinally. Long.  $\frac{3}{10}$  inch, lat.  $\frac{1}{10}$  inch. C. C. Sutton.

\* — *Jeffreysii*, A. Bell, n. sp. Shell short, broad, turreted, owing to the semiangulation of the upper part of the whorls; suture deep; whorls 5-6, the last composing three fifths of the entire shell; mouth long and oval, more so than in the foregoing species, and slightly patulated below; apex blunt; sculpture, deeply incised spiral striae passing over the lines of growth, which are well marked; umbilical chink very distinct. Long.  $\frac{1}{8}$  inch, lat.  $\frac{3}{20}$  inch. R. C. Walton-Naze.

I have been able, by the kindness of Mr. Jeffreys (to whom I respectfully dedicate the species), to collate the above with an undescribed shell from the Greenland seas.

*Hydrobia ulva*, var. *subumbilicata*. R. C. Walton-Naze.

*Rissoa striata*, Mont. Chil. ser. Aldeby.

\* *Trochus bullatus*, Philippi, En. Moll. Sic. t. 28. f. 8. I have obtained two specimens, one decorticated (similar to the shell figured in the Mon. Crag Moll. t. 13. f. 4), from the Coralline Crag, Gedgrave. Prof. Seguenza has sent me a series of Philippi's *Trochus* in all stages of growth and preservation; and a close comparison of their sculpture and form enable me to correlate the Italian and Crag shells.

— *millegranus*, Wood, non Philippi. R. C. Walton-Naze.

— *multigranus*, Wood. C. C. Orford.

\* *Emarginula elongata*, Costa (Phil. En. Moll. Sic. t. 7. f. 13). C. C. Gedgrave.

*Capulus unguis*, Sow. (S. Wood, Mon. Crag Moll. t. 17. f. 2 b). This appears to be a deep-water variety (?) of *C. hungaricus* (if it is a variety). I have lately obtained it from the Coralline Crag at Gedgrave and the Red Crag of Waldringfield and Shottisham Creek. Mr. Wood mentions it from Sutton. I consider it to be a distinct species.

\* *Brocchia sinuosa*, Brocchi, Conch. foss. Subap. t. 1. f. 1. C. C. Gedgrave. This genus, established by Bronn, is in some respects unsatisfactory; but the constancy and position of the folds, both in the Suffolk, Belgian, and Italian shells, can hardly be the result of accident; and the occurrence of two other forms in the English Crag, equally distinct in

outline and constancy of folding, seems to necessitate the separation of these sinuated forms from the ordinary run of *Capuli*, particularly as the adhesion of the latter is effected more by the long velvety epidermis than the test itself. The genus, being adopted by so many continental malacologists, is perhaps as well kept in the present instance as not. The whole of the fossil *Capuli* need revision.

Prof. Biondi, in a memoir upon this genus, enumerates eight species, one of which (*B. Meneghinii*, t. 5. f. 2) may be the one described by myself as *Capulus? incertus*. If it is so, my name must be expunged.

\**Dentalium rectum*, Gmelin. R. C. Waldringfield.

—— *costatum*, Sow., = *D. dentalis*, L.

## POLYZOA.

### Coralline Crag.

*Membranipora Savartii*, And. Sutton.

### Red Crag.

*Alveolaria semiovata*, Busk. Waldringfield.

*Cellepora cæspitosa*, Busk.

—— *compressa*, Busk. Waldringfield, Butley.

—— *edax*, Busk. Waldringfield (on *Littorina littorea*).

*Eschara monilifera*, M.-Edw. Waldringfield.

—— *sinuosa*, Busk. Waldringfield, Butley.

—— *Sedgwickii*, M.-Edw. R. C. Walton-Naze.

*Fungella multifida*, Busk. Butley.

*Hemeschara imbellis*, Busk. Waldringfield.

*Heteropora pustulosa*, Busk. Waldringfield.

*Hornera frondiculata*, Lam. Waldringfield, Foxhall.

—— *infundibulata*, Busk. Waldringfield, Sutton.

—— *rhomboidalis*, Busk. Waldringfield.

—— *striata*, M.-Edw. Waldringfield.

*Lepralia Peachii*, Johnst. Waldringfield (on otolite of *Phœcæna*).

*Membranipora Pouilletii*, And. Waldringfield.

*Salicornaria crassa*, S. Wood. Walton-Naze.

—— *sinuosa*, Hassall. Walton-Naze.

### Chillesford Clays.

*Membranipora monostachys*, Busk. Sudbourn.

## ACTINOZOA.

*Solenastræa Prestwichi*, Duncan. R. C. Waldringfield.

## PROTOZOA.

*Clione celata*, Grant. R. & C. C.

## PLANTÆ.

*Conifer*, sp. R. C. Waldringfield.XLVI.—*Physico-chemical Investigations upon the Aquatic Articulata.* By FÉLIX PLATEAU. Part I.\*

THIS first part includes the investigation of the phenomena presented by the aquatic Articulata (Insects, Arachnida, and Crustacea) when placed in liquids the saline composition of which is not the same as that of the waters in which they habitually live. In the present memoir I have left out of consideration mineral waters properly so called, as their extremely varied composition would have necessitated a considerable number of experiments the results of which would have been of little use.

The influence of sea-water, or of salt water, upon the Articulata which usually inhabit fresh water, and that of fresh water upon the marine Articulata, on the contrary, possessed some real scientific interest. We have long known several species of fish which are able to live indifferently in both liquids, and we also know that there are Crustacea and beetles endowed with the same faculty. But, side by side with these few exceptions, what an enormous quantity of aquatic species which always seek the same water and the same conditions, and to which the least modification seems to be injurious! Why should the carnivorous larvæ of the fresh waters have a repugnance to exchange their ordinary fare for species of *Mysis*, *Slabberina*, and *Cetochilus*, or even young marine fishes? What is the cause that prevents many marine Crustacea from ascending the rivers by the aid of the tide, and taking up their abode in waters rich in living prey, and where, by their strength and the hardness of their integuments, they would soon reign as masters?

The very nature of the experimental researches to which these reflections have led me renders a summary exposition of them very difficult. As it is impossible here to reproduce the tables containing the results of numerous experiments, I shall confine myself to the enunciation of the various conclusions at which I have arrived, following these, if there is occasion, with some observations or with a few examples.

\* Abstract of a Memoir in the 'Mémoires de l'Académie Royale de Belgique,' 1870. Communicated by the Author.